

## PATENT SPECIFICATION

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## COMPLETE SPECIFICATION

## Shoe

I, PAUL GROUVEN, of 20, Habsburger-  
ring, Cologne, Germany, of German  
nationality, do hereby declare the nature  
of this invention and in what manner the  
same is to be performed, to be particularly  
described and ascertained in and by the  
following statement:—

It has been proposed to provide forms of  
shoes and shoe inserts which, starting with  
the very common foot deformations and  
foot complaints, have the object not only  
to heal diseased feet, remove existing  
complaints and render walking pleasant  
and effortless by making certain appro-  
priate provisions, but also to retain  
healthy feet in healthy condition by  
causing the muscles, sinews and joints to  
work properly and preventing undue  
pressure to be exerted upon those parts of  
the sole which are unsuitable for carrying  
a heavy load. It is often and rightly  
pointed out as a justification of these  
provisions that our present day footwear is  
the main cause of the troubles and com-  
plaints referred to above. In this  
connection not only inferior footwear and  
defects due to the vagaries of fashion are  
blamed, the harmful effects of which are  
unanimously recognized, but it is also  
admitted that shoes as at present provided  
—even in their best form—cannot be  
regarded as representing a satisfactory  
solution of the problem of footwear.

Since by far the greatest proportion of  
foot complaints finds visible expression in  
the dropping of the foot arch and treading  
over of the feet outwardly, the majority of  
the known expedients is directed towards  
lifting or supporting the overloaded or  
dropped arch and compensating for the  
treading over of the foot by correcting the  
position thereof.

For supporting the longitudinal arch it  
has been proposed to provide suitably  
arched shoes or inserts of metal, leather,  
wood, cork, rubber, sponge, air cushions  
and the like, which are adapted to exert  
direct pressure upon the endangered arch  
from the direction of the metatarsus. The  
transverse arch of the forepart of the foot,  
which cannot suffer direct pressure, is  
raised by an elevated portion under the  
middle of the metatarsus, directly behind

the transverse arch, such portion being  
sometimes referred to as the metatarsal  
pad. Such pad is also made of the  
materials mentioned above. Flat foot  
bandages, which surround the forepart of  
the foot, are also known.

The provisions directed towards the  
correction of the position of the foot  
attempt to take into account the fact,  
accepted as correct by the orthopaedic  
science, that the tarsus, particularly the  
heel, is distinctly inwardly inclined  
(supine or varus position). Therefore,  
these provisions tend to twist the heel  
inwardly and the forepart of the foot in  
the opposite direction. The torsion and  
counter-torsion of the foot is referred to,  
the pivotal point being located in the  
metatarsus.

Such correction of the position of the  
foot is attempted by the employment of  
pads under the inner portion of the heel  
and by raising the root portion of the  
small toe. Many different means are  
employed, such as protuberances in the  
shoe, twisting of the sole of the shoe and  
inserts adapted to be placed in the normal  
shoe.

Other propositions lay particular  
emphasis upon the comfortable bedding  
of the sole of the foot. For this purpose  
it has been proposed to provide depres-  
sions for the principal load bearing points  
of the sole of the foot, namely the heel  
and the roots of the big and small toes.  
This adaptation of the shoe sole surface  
to the foot sole also has for its object to  
support the arch.

These supporting, correcting and form  
fitting provisions are often combined for  
the purpose of achieving the best possible  
result.

However, all these proportions take as  
a basis the position of rest of the relaxed  
foot. But the foot, as a living structure,  
is not responsive to these provisions.  
None of these provisions assures greater  
freedom of movement of the joints or a  
more favourable stressing of the muscles  
and sinews.

The present invention follows an  
entirely novel procedure in order to  
prevent treading over on the balls of the

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small toes and the complaints consequent thereon.

According to this invention a shoe with a heel, the tread surface of which is  
5 formed as a convex prominence is characterised by the feature that the prominence extends symmetrically with reference to the central axis of the heel from the forward edge of the heel to about the  
10 middle of the rear third of the heel at the same level and drops towards the other edges of the heel with a slightly convex arch. Advantageously the lower edges of the lateral bounding surfaces of the  
15 heel project.

A further feature of the shoe constructed in accordance with the invention is that the inner surface of the shoe on which the foot rests is arched with a  
20 slight convexity towards the foot in a direction and position corresponding to the centre portion of the fourth metatarsal bone (corpus metatarsi IV) i.e. underneath the outer lateral metatarsus.  
25 By this means, the function of the foot movement is influenced, since during the movement of the foot, the weight is directed from the lateral portion of the actual foot section in the direction of the  
30 ball of the big toe.

A shoe embodying the above features permits movement of the foot in almost exactly the same manner as if it were bare whereas, at the best the hitherto  
35 known remedies produce a twisted foot position, and the hitherto known heels with rounded supporting surfaces have proved to be useless on account of their inherent defects.

40 It is essentially of advantage if the bottom edges of the lateral bounding surfaces of the heel project. In this way, the supporting surface is increased, which makes for a more certain tread  
45 and counteracts the danger of treading over, which is of particular importance with high heels.

The hitherto usual passive support of injured or fallen foot arches is dispensed  
50 with, because the foot complaints, as is known, are not dependent upon the height of the foot arch, but upon the failure of the muscles which span the arch.

55 In view of the variety of these arches, it is scarcely possible to manufacture a mass-production shoe which is adapted to these various foot arches. A shoe manufactured according to the invention,  
60 on the contrary, has the merit that it exerts the desired effect on the different foot arches, on flat feet as well as on normal and high-arched feet. Since in view of the present day manner of living,  
65 and on account of the hitherto usual

unsuitable foot coverings, only very few people have undeformed feet and, in fact, have a tendency towards a sunk or twisted foot position, because important  
70 groups of muscles are weak due to insufficient use, it has been proved expedient, and even necessary if some derangement of the foot has already made itself apparent, to effect a slightly  
75 corrective action on the foot position during walking by means of the normal shoe.

The heels may be made of rubber and when so made inclined scoring of the tread surface of the heel to prevent  
80 slipping is desirable.

The accompanying drawings shows an embodiment of the invention by way of example.

Fig. 1 is a plan view of the inner surface of the shoe upon which the foot rests and shows the heel.

Fig. 2 is a section of Fig. 1 on the line II—II,

Fig. 3 is a section of Fig. 1 on the line III—III,

Fig. 4 is a section of Fig. 1 on the line IV—IV,

Fig. 5 is a section of Fig. 1 on the line V—V and

Fig. 6 is a plan view of the heel.

Referring to the drawing, the arching of the inner surface of the shoe upon which the foot rests is indicated as beginning at 1 and the arching is continued as indicated by the chain dotted line 2, in the direction of the front part of the metatarsus, so that the inner surface of the shoe is arched with a slight convexity towards the foot in a  
105 direction and position corresponding to the centre position of the fourth metatarsal bone (corpus metatarsi IV) i.e. underneath the outer lateral metatarsus. The lines 3 indicate how the  
110 raised or arched portion of the inner surface of the shoe diminishes in thickness. The arrows 4 indicate the direction of the foot in walking. Fig. 2 is a longitudinal sectional view of Fig. 1 and  
115 shows the inner surface of the shoe in section. It shows, moreover, the heel, which comprises the prominence 5 extending symmetrically with reference to the central axis of the heel, at the same level,  
120 from the sole or forward edge to about the middle of the rear third of the heel. Fig. 3 is a section on the line III—III of Fig. 1 and illustrates the construction of the elevated part of the inner surface of the shoe. The heel is indicated at 7, the outer sole at 8, the inner sole at 9 and the actual insertion forming the elevation or arching of the inner surface of the shoe sole at 10. Fig. 4 shows a section on the  
130

- line IV—IV of Fig. 1. This also shows the outer sole 8 and the inner sole 9, while 10 indicates the insertion, which may be formed of leather or metal.
- 5 Fig. 5, which is a section on the line V—V of Fig. 1, shows how the arching of the inner surface of the shoe sole diminishes in thickness, 8 is again the outer sole, 9 the inner sole and 10 the insertion.
- 10 Fig. 6 is a plan view of the heel. The line 5 indicates the prominent part of the heel, from which the tread surface of the heel drops towards the edges of the heel (with the exception of the sole or front edge) with a gentle convex arch. At 11 the heel is brought forward in an arcuate manner under the longitudinal arch, so as to provide better support for the longitudinal arch of the shoe and reduce
- 20 the danger of the dropping of said arch. It is within the invention to modify the practical embodiment in many different ways. In particular, the arching of the inner surface of the shoe sole may be
- 25 effected in any suitable manner and the insertions forming the arching may be made of leather, metal or other materials. Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim
- 30 is:—
1. A shoe with a heel, the tread surface of which is formed as a convex prominence, having the characteristic feature that the prominence extends symmetrically with reference to the central axis of the heel from the forward edge of the heel to about the middle of the rear third of the heel at the same level and drops towards the other edges of the heel with a slightly convex arch.
  2. A shoe as claimed in claim 1, wherein the lower edges of the lateral bounding surfaces of the heel project.
  3. A shoe as claimed in claim 1 or 2, wherein the inner surface of the shoe upon which the foot rests is arched with a slight convexity towards the foot in a direction and position corresponding to the centre portion of the fourth metatarsal bone (corpus metatarsi IV), i.e. underneath the outer lateral metatarsus.
  4. A shoe as claimed in claim 1, constructed substantially as hereinbefore described with reference to the accompanying drawing.

Dated this 9th day of October, 1936.

For the Applicant,

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[This Drawing is a reproduction of the Original on a reduced scale.]

